# P. E. S. COLLEGE OF ENGINEERING, MANDYA

## Scheme of Teaching and Examinations - 2025

## Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

## (Effective from the academic year 2025-26)

**B.E. II – Semester [Physics Group]** | **Stream: –Mechanical Engineering Stream (MES)** | **Programme: Mechanical Engineering and RAI**

| Sl. No | Course and Course Code | | Course Title | TD/PSB | Teaching Hours/Week | | | | Examination | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Theory Lecture | Tutorial | Practical/ Drawing | SAAE | SEE Duration in hours | CIE Marks | SEE Marks | Total Marks | |
| | | | | | L | T | P | S | | | | | |
| 1 | ASC | P25MAME201 | Multivariable Calculus and Numerical Methods | Mathematics | 3 | 2 | 0 | | 03 | 50 | 50 | 100 | 04 |
| 2 | ASC | P25PHME202 | Physics of Materials | Physics | 3 | 0 | 0 | | 03 | 50 | 50 | 100 | 03 |
| 3 | ETC | P25ETC203 | Introduction to AI and Applications | Respective Engineering dept | 2 | 0 | 2 | | 03 | 50 | 50 | 100 | 03 |
| 4 | ESC | P25ESC2043 | Introduction to Electronics & Communication Engineering | ECE | 3 | 0 | 0 | | 03 | 50 | 50 | 100 | 03 |
| 5 | PSC | P25PSC2052 | Elements of Mechanical Engineering | Respective Engineering dept | 3 | 0 | 0 | | 03 | 50 | 50 | 100 | 03 |
| 6 | PSCL | P25PSCL2064 | Elements of Mechanical Engineering Laboratory | Respective Engineering dept | 0 | 0 | 2 | | 03 | 50 | 50 | 100 | 01 |
| 7 | ASC | P25CHMEL207 | Physics of Materials Laboratory | Physics | 0 | 0 | 2 | | 03 | 50 | 50 | 100 | 01 |
| 8 | AEC | P25ENG208 | Communicative English – II | Humanities | 0 | 2 | 0 | | 02 | 50 | 50 | 100 | 01 |
| 9 | AEC/ SDC | P25IDT209 | Interdisciplinary Project Based Learning | Any Dept | 0 | 0 | 2 | | 02 | 50 | 50 | 100 | 01 |
| 10 | HSMS | P25KSK210/ P25KBK210 | Samskrutika Kannada/ Balake Kannada | Humanities | 1 | 0 | 0 | | 01 | 100 | -- | 100 | PP |
| | **TOTAL** | | | | | | | | | **550** | **450** | **1000** | **20** |

| | | |
|---|---|---|
| 10 | **AICTE Activity Points** (students have to earn **100** activity points between 01 to 08 semesters) | Compulsory requirement for the award of a degree |

**S- (SAAE)**Students Academic Activity Engagement Hours, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **IC** – Integrated Course (Practical Course Integrated with Theory Course), **PLC(IC)**- Programming Language Course (Integrated Course), **AEC**- Ability Enhancement Course, **AEC/SDC**- Ability Enhancement Course/Skill Development course, **ETC**- Emerging Technology Course, **TD/PSB**- Teaching Department / Paper Setting Board, **HSMC**- Humanity, Social Science and management Course, **CIE** –Continuous Internal Evaluation, **SEE**- Semester End Examination, **NCMC:** Non Credit Mandatory Course, **PP** : (Pass/Pass) is assigned to a non-credit course. "PP" represents pass in course provided students have successfully completed the CIE requirements. Otherwise, "NP-not pass shall be awarded. "PP" is essential for the award of the degree

| | |
|---|---|
| **Credit Definition:**<br>1-hour Lecture **(L)** per week=**1Credit** 2-hoursTutorial**(T)** per week=**1Credit**<br>2-hours Practical / Drawing **(P)** per week=**1Credit** | 04-Credits courses are to be designed for 50 hours of Teaching-Learning Session<br>04-Credits (IC) are to be designed for 40 hours' theory and 10-12 hours of practical sessions 03-Credits courses are to be designed for 40 hours of Teaching-Learning Session<br>02- Credits courses are to be designed for 25 hours of Teaching-Learning Session<br>01-Credit courses are to be designed for 12 hours of Teaching-Learning sessions |

The **Student Induction Programme** (SIP), initiated by the All India Council for Technical Education (AICTE), is designed to help newly admitted students in technical institutions transition smoothly into the higher education environment. It aims to familiarize students with the institutional culture, foster connections with peers and faculty, and provide a foundation for holistic learning. The first year of Engineering programmes is composed of I semester and II semester and Summer Semester. SIP activities shall be scheduled in the afternoon sessions during the first week of class commencement of I and II semesters only. Activities under SIP may include Physical Activities, Creative Arts, Universal Human Values, Literary Events, Proficiency Modules, Lectures by Eminent Personalities, Local Area Visits, Department/Branch Familiarization, and Innovation-related sessions. The specific programmes to be conducted will be notified separately by the University, with the academic calendar or separately.

**AICTE Activity Points Requirement for BE/B.Tech. Programmes**

As per AICTE guidelines (refer Chapter 6 – *AICTE Activity Point Program, Model Internship Guidelines*), in addition to academic requirements, students must earn a specified number of **Activity Points** to be earned is to be eligible for the award of their degree.

- **Regular students** admitted to a 4-year degree program must earn **100 Activity Points**.
- **Lateral entry students** (joining from the second year) must earn **75 Activity Points**.
- **Students transferred** from other universities directly into the fifth semester must earn **50 Activity Points** from the date of entry into VTU.

These Activity Points are **non-credit** and will not be considered for **the SGPA/CGPA** or be used for **vertical progression**. However, they are mandatory for the **award of the degree**, and the points earned will be reflected on the **eighth semester Grade Card**.

The hours spent for earning the activity points shall not be counted for regular attendance requirements. Students can accumulate these points at any time during their program, including on weekends, holidays, and vacations starting from the year of admission, provided they meet the minimum hours of engagement prescribed for each activity.

If a student fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Consequently, the degree will be awarded only after the Grade Card has been released.

| Applied Mathematics-I | | | | | Applied Chemistry | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Code** | **Title** | **L** | **T** | **P** | **Code** | **Title** | **L** | **T** | **P** |
| P25MACV101 | Differential Equations and Linear Algebra: CV Stream | 3 | 2 | 0 | P25CHCV102 | Applied Chemistry for Sustainable Built Environment (CV) | 3 | 0 | 0 |
| P25MAME101 | Differential Calculus and Linear Algebra: ME Stream | 3 | 2 | 0 | P25CHME102 | Applied Chemistry for Metal Protection and Sustainable Energy (ME) | 3 | 0 | 0 |
| P25MAEE101 | Calculus and Numerical Techniques: EEE Stream | 3 | 2 | 0 | P25CHEE102 | Applied Chemistry for Futuristic Devices (EEE, ECE) | 3 | 0 | 0 |
| P25MACS101 | Calculus and Linear Algebra: CSE Stream | 3 | 2 | 0 | P25CHCS102 | Applied Chemistry for Smart Systems (CSE) | 3 | 0 | 0 |
| | | | | | | | | | |
| **(ESC-I) Engineering Science Courses-I** | | | | | **(PLC) Programming Language Courses and Laboratory** | | | | |
| **Code** | **Title** | **L** | **T** | **P** | **Code** | **Title** | **L** | **T** | **P** |
| P25ESC1041 | Introduction to Building Sciences | 3 | 0 | 0 | P25PLC1051 | Introduction to C Programming (For none IT programmes) | 3 | 0 | 0 |
| P25ESC1042 | Introduction to Electrical Engineering | 3 | 0 | 0 | P25PLC1052 | Python Programming (for CSE and allied programmes) | 3 | 0 | 0 |
| P25ESC1043 | Introduction to Electronics & Communication | 3 | 0 | 0 | P25PLCL1061 | Introduction to C Programming Laboratory (For none IT programmes) | 0 | 0 | 2 |
| | | | | | P25PLCL1062 | Python Programming Laboratory (For CSE and allied programmes) | 0 | 0 | 2 |
| P25ESC1044 | Introduction to Mechanical Engineering | 3 | 0 | 0 | **Computer Aided Engineering Drawing** | | | | |
| P25ESC1045 | Essentials of Information Technology | 3 | 0 | 0 | P25ESC1031 | Computer Aided Drawing for CV Stream | 2 | 0 | 2 |
| | | | | | P25ESC1032 | Computer Aided Drawing for ME stream Engineering | 2 | 0 | 2 |
| | **Applied Chemistry Lab (ASC Lab)** | | | | P25ESC1033 | Computer Aided Drawing for EEE stream | 2 | 0 | 2 |
| P25CHCVL107 | Applied Chemistry Laboratory (Applied Chemistry for Sustainable Built Environment) | 0 | 0 | 2 | P25ESC1034 | Computer Aided Drawing for CSE stream | 2 | 0 | 2 |

**The Mathematics/Chemistry courses shall be taught by a single faculty member per session, with no sharing of the course (subject) modules.** The **tutorial sessions** for the **mathematics course** shall be conducted in the Laboratory environment using **MATLAB software** to enhance computational understanding and application skills.

Students admitted to a specific engineering stream are required to select and successfully complete **Applied Mathematics-I** and **Applied Chemistry courses** that are aligned with their program stream. These courses are intended to reinforce the academic foundations and develop the professional competencies relevant to their chosen engineering discipline.

**Engineering Sciences Courses-I (ESC-I):** These courses are designed to broaden the technical knowledge of students beyond their core area of study. These courses enable students to gain a foundational understanding of engineering principles from other stream courses. Students are required to select and complete two courses that are not belong to their admitted program stream. For example, a student admitted to the any programme of the Civil Engineering stream should not select Introduction to Building Sciences but any other two. One course shall select under ESC-I and another course under ESC-II. The two courses must be different from the other.

**F**or the course **Interdisciplinary Project,** it is mandatory to form a team comprising students from multiple engineering disciplines. For example, a project team may include students from Mechanical Engineering, Electronics and Communication Engineering (ECE), and Computer Science and Engineering (CSE), working collaboratively to design and implement the project.

**Computer-Aided Engineering Drawing:** The courses under this category are stream-specific. Students must select and complete the course that corresponds to their admitted engineering stream.

## II Semester

| Course Title | **Multivariable Calculus and Numerical Methods** | | | | | | |
|---|---|---|---|---|---|---|---|
| Course Code | **P25MAME201** | | | | | | |
| Category | **Mathematics for ME Stream** | | | | | | |
| Scheme and Credits | Theory/Practical/Integrated | | | | | Total teaching hours | Credits |
| | L | T | P | SS | Total | | |
| | 3 | 2 | 0 | -- | 04 | (40 Hours Theory + 20 Hours Tutorial) | 04 |
| **CIE Marks:50** | **SEE Marks:50** | | **Total Max. marks=100** | | **Duration of SEE:03Hours** | | |

**Course Learning Objectives:**

| | |
|---|---|
| **1** | Apply the concepts of integral calculus, higher order differential equations, and vector calculus to model and solve problems in engineering applications such as area, volume, heat conduction, and field analysis. |
| **2** | Apply appropriate numerical methods to find approximate solutions of algebraic, transcendental, and ordinary differential equations and to perform interpolation and numerical integration in engineering contexts. |
| **3** | Demonstrate the applications of mechanical engineering and allied engineering science using modern ICT tools. |

| Unit | Syllabus content | No. of hours |
|---|---|---|
| I | **Integral Calculus:** Multiple Integrals: Definition, Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions.<br>**Self-Study**: Volume by triple integration, Center of gravity | 8 hours |
| II | **Ordinary Differential Equations of Higher Order:** Higher-order ordinary differential equations with constant coefficients, homogeneous and non-homogeneous equations-$e^{ax}$, sin(ax+b), cos(ax+b), $x^n$ only, Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations. Applications: mass spring model.<br>**Self-**Study: Method Undetermined coefficients. | 8 hours |
| III | **Vector Calculus:** Scalar and vector fields. Gradient, directional derivative, divergence and curl - physical interpretation, solenoidal vector fields, irrotational vector fields and scalar potential. Vector Integration: Line integrals, work done by a force and flux. Statement of Green's theorem and Stoke's theorem and problems without verifications.<br>**Self-Study**: Volume integral and Gauss divergence theorem. | 8 hours |

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|---|---|---|
| IV | **Numerical Methods – 1:** Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods. Interpolation: Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula. Numerical integration: Trapezoidal, Simpson's 1/3rd and 3/8th rules. **Self-Study**: Boole's rule. | 8 hours |
| V | **Numerical Methods – 2:** Numerical solution of ordinary differential equations of first order and first degree: Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order, Milne's predictor-corrector formula and Adams-Bashforth predictor-corrector method. **Self-Study**: Runge-Kutta method of second order. | 8 hours |

**COURSE OUT COMES: On** completion of the course, student should be able to:

**CO1:** Apply the concepts of integral calculus, higher order differential equations, and vector calculus to model and solve problems in engineering applications such as area, volume, heat conduction, and field analysis.

**CO2:** Apply appropriate numerical methods to find approximate solutions of algebraic, transcendental, and ordinary differential equations and to perform interpolation and numerical integration in engineering contexts.

**CO3:** Demonstrate the applications of mechanical engineering and allied engineering science using modern ICT tools.

**TEACHING – LEARNING PROCESS: Chalk and Talk, power point presentation, animations,**

**TEXTBOOKS:**


1. B. S. Grewal, Higher Engineering Mathematics, 44th Edition 2018, Khanna Publishers, New Delhi.
2. E. Kreysizig, Advanced Engineering Mathematics, John Wiley and sons,10th Ed. (Reprint) 2016.
3. M. K. Jain, S.R.K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, 8thEd., 2022.


**REFERENCEBOOKS:**


1. B.V. Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017
2. Srimanta Pal &Subodh C. B hunia, Engineering Mathematics, Oxford University Press, 3rd Ed., 2016.
3. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 10th Ed.,2022.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication,3rd Ed., 2014.
5. Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw Hill Book Co., New York,6th Ed., 2017.
6. Steven V. Chapra and Raymond P. Canale, Applied Numerical Methods with Matlab for Engineers and Scientists, McGraw-Hill, 3rd Ed., 2011.
7. Richard L. Burden, Douglas J. Faires and A. M. Burden, Numerical Analysis, 10th Ed.,2010, Cengage Publishers.

8. S.S. Sastry, "Introductory Methods of Numerical Analysis", PHI Learning Private Limited, 5th Ed., 2012

**Web links and Video Lectures (e-Resources):**

- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program
- https://nptel.ac.in/courses/111105160
- https://nptel.ac.in/courses/127106019
- https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
- https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2012/pages/syllabus/

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | | | | | | | | | | |
| CO2 | 2 | 3 | | | | | | | | | | |
| CO3 | 3 | 2 | | | | | | | | | | |
| **Strength of correlation:** Low-1, Medium-2, High-3 | | | | | | | | | | | | |

| **Academic Year: 2025-26** | | |
|---|---|---|
| **Course Title: Physics of Materials** | | |
| **Course Code: P25PHME202** | **Semester: II** | **Scheme: P25** |
| **Teaching hours/week (L:T:P): (3:0:0)** | **CIE Marks:50** | **CIE Weightage:50%** |
| **Credits: 03** | **SEE Marks:50** | **SEE Weightage: 50%** |
| **Teaching hours of Pedagogy: 40 hours Theory** | **Total: 100** | **Exam Hours: 3 Hrs** |

**Course Learning Objectives:**

- To **learn** the basics of simple, damped and forced oscillations and how they work in mechanical and electrical systems.
- To **understand** elasticity and the mechanical properties of materials under different conditions.
- To **study** about thermoelectric effects, thermoelectric devices and their applications.
- To **explore** the cryogenic techniques, low-temperature physics and their applications.
- To **study** the structural, electrical and thermal properties of materials through material characterization and instrumentation.

| **UNIT-I** | **Hrs: 08** |
|---|---|

**Oscillations:** Oscillations: Simple harmonic motion (SHM), Differential equation for SHM, Springs: Stiffness factor and its physical significance, Series and Parallel combination of springs (Derivation), Types of springs and their applications. Theory of damped oscillations, Types of damping (Graphical Approach). Engineering applications of damped oscillations, Theory of forced oscillations with derivation, Resonance, Sharpness of resonance, Resonance in LCR circuits (Qualitative), Numerical problems.

**Prerequisite:** Fundamentals of physics and wave theory

**Self-Study Component:** Theory of forced oscillations

| **UNIT - II** | **Hrs: 08** |
|---|---|

**Elasticity:** Review Stress-Strain Curve, Strain hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Static and dynamic loading, Beams, Bending moment and derivation of expression, Cantilever, Torsion and Expression for couple per unit twist, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), S-N Curve, Numerical problems.

**Prerequisite:** Basics of mechanics and material sciences

**Self-Study Component:** Cantilever and torsion

| UNIT - III | Hrs: 08 |
|---|---|
| **Thermoelectric materials and devices:** Thermoemf and thermo current, Seebeck effect, Peltier effect, Seeback and Peltier coefficients, figure of merit (Mention Expression), laws of thermoelectricity. Expression for thermoemf in terms of T1 and T2, Thermo couples, thermopile, Construction and working of thermoelectric generators (TEG) and Thermoelectric coolers (TEC), low, mid and high temperature thermoelectric materials, Applications: Exhaust of automobiles, Refrigerator, Space program(Radioisotope Thermoelectric Generator- RTG), Numerical Problems | |
| **Prerequisite:** Thermal and electrical properties of materials | |
| **Self-Study Component:** Construction and working of TEG and TEC | |
| **UNIT - IV** | **Hrs: 08** |
| **Cryogenics:** Introduction to Thermodynamics, Carnot's principle, Efficiency, Production of low temperature - Joule Thomson effect (Derivation with 3 cases), Porous plug experiment with theory, Thermodynamical analysis of Joule Thomson effect, Liquefaction of Oxygen by cascade process, Lindey's air liquefier, Liquefaction of Helium and its properties (superfluidity), Platinum Resistance Thermometer, Applications of Cryogenics: Aerospace, Dewar Flask, Numerical Problems | |
| **Prerequisite:** Fundamentals of thermodynamics and physics of low temperatures | |
| **Self-Study Component:** Aerospace and dewar flask | |
| **UNIT - V** | **Hrs: 08** |
| **Material Characterization and Instrumentation Techniques:** Materials Properties: Wave Partical dualism, Schrodinger equation, Interpretation of wave function, Particle in an infinite 1D potential well, Quantum confinment in 0, 1, 2 and 3 Dimesion (Qualitative), Density of states expressions and graphical representation, Optical properties due to quantum confinement, blue shift, absorption, florescence, Quantum tunnelling Instrumentation Techniques: X-Ray Diffractometer (XRD), Schrerrer equation, Atomic Force Microscope (AFM), X-ray Photoelectron Spectroscopy (XPS), Scanning Electron Microscope (SEM), Numerical Problems. | |
| **Prerequisite:** Introductory knowledge of characterization tools | |
| **Self-Study Component:** XPS and SEM | |

| **Course Outcomes:** At the end of the course students should be able to: |
|---|
| **CO1: Apply** simple harmonic, damped, and forced oscillations in mechanical and electrical systems. |
| **CO2: Describe** stress, strain, and elastic moduli concepts to evaluate elastic behavior. |
| **CO3: Explain** thermoelectric effects and assess materials/devices for energy conversion and thermal management. |
| **CO4: Summarize** the knowledge of low-temperature physics, cryogen production methods, and cryogenic applications. |
| **CO5: Discuss** material characterization techniques and instrumentation for analyzing macroscopic and microscopic properties of engineering material. |

**Suggested Learning Resources:**

**Textbooks:**

| | **Title** | **Author** | **Year & Edition** | **Publisher** |
|---|---|---|---|---|
| 1. | Physics, Oscillations and Waves, Optics and Quantum Mechanics | H M Agarwal and R M Agarwal | 2025 | Pearson |
| 2. | Engineering Physics | Satyendra Sharma and Jyotsna Sharma | 2018 | Pearson |
| 3 | A Text book of Engineering Physics | M N Avadhanulu, P G Kshirsagar | 2014 | S Chand |
| 4 | Fundamentals of Cryogenic Engineering | Mamata Mukhopadhyay | -- | PHI Learning (India) |
| 5 | Characterization of Materials | Mitra P K | -- | Prentice Hall India Learning Private Limited |

**Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1. | Vibrations and Waves | A P French | 2003 | MIT introductory Physics |
| 2. | Elements of Properties of Matter | D S Mathus | 2016 | S Chand |
| 3. | Engineering Physics | S L Kakani, Shubra Kakani | 3rd Edition, 2020 | CBS Publishers and Distributers Pvt. Ltd., 2018 |
| 4. | Cryogenics: A Text Book | S S Thipse | 2013 | Alpha Science International Limited |
| 5. | Treatise on Heat | M N Saha and B N Srivastava | 2nd Edition, 1935 | Indian Press, University of California |
| 6. | Materials Characterization Techniques | Sam Zhang, Lin Li, Ashok Kumar | First Edition, 2008 | CRC Press |

| **Weblinks and Video Lectures (e – resources)** |
|---|
| 1. Lecture Series on Physics - I: Oscillations and Waves by Prof. S. Bharadwaj, Department of Physics and Meteorology, IIT Kharagpurn: https://www.youtube.com/watch?v=gnD8Se92hfk.<br>2. Waves and Oscillations: https://www.youtube.com/watch?v=xoJWoMQwTAw&list=PLyqSpQzTE6M9X7oRXliYM8t0aaR_N0Csd.<br>3. Stress- strain curves :https://web.mit.edu/course/3/3.11/www/modules/ss.pdf.<br>4. Stress curves: https://www.youtube.com/watch?v=f08Y39UiC-o.<br>5. Cryogenic Engineering by Prof. M.D. Atrey , Department of Mechanical Engineering, IIT Bombay.: https://www.youtube.com/watch?v=4gGMBNEzeuc.<br>6. Liquefaction of gases: https://www.youtube.com/watch?v=aMelwOsGpIs.<br>7. Non-destructive testing: https://youtu.be/JGQnbwxPiFA.<br>8. Non-destructive testing: https://youtu.be/uzogGRDSmMA.<br>9. Materials Characterisation : https://youtu.be/SXIYzrFGmkU. |

| **Teaching Learning Process:** | |
|---|---|
| 1. Chalk and talk | 2. Short Animations and Videos |
| 3. Experimental Learning | 4. Active based Learning |
| 5. Hybrid Learning | 6. Simulations and Interactive Simulations |
| 7. ICT Based Learning | 8. Self Learning using AI Tools |

| **Active Based Learning (Suggested Activities in Class)/Practical Based Learning** |
|---|
| http://nptel.ac.in<br>https://swayam.gov.in<br>https://virtuallabs.merlot.org/vl_physics.html<br>https://phet.colorado.edu<br>https://www.myphysicslab.com |

**Course Articulation Matrix of Physics of Materials (ME stream)**

| **COs / POs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | - | 2 | - | - | - | - | - | - | - |
| **CO2** | 3 | - | 2 | - | 2 | - | - | - | - | - | 2 |
| **CO3** | 3 | 2 | - | - | 2 | - | - | - | - | - | - |
| **CO4** | 3 | - | - | 3 | - | - | - | - | - | - | 2 |
| **CO5** | 3 | - | - | 3 | 3 | - | 1 | - | - | - | 2 |

| Academic Year: 2025-26 | Semester: II | Scheme: P25 |
|---|---|---|
| Course Title: **Introduction to AI and Applications** | | |
| Course Code: **P25ETC103** | CIE Marks: 50 | CIE Weightage:**50%** |
| Teaching hours/week (L:T:P: S): 3:0:0:0 | SEE Marks: 50 | SEE Weightage:**50%** |
| Credits: **3** | | |

**Course learning Objectives:**

- Able to understand the fundamental concepts, history, and types of Artificial Intelligence (AI).
- Develop an understanding of prompt engineering techniques and their role in generative AI communication.
- Able to apply the basic machine learning methods for regression, classification, and clustering.
- Provide awareness of recent trends, ethical concerns, and industrial applications of AI, including robotics, drones, AIoT, and no-code/low-code AI platforms.
- Explore real-world applications of AI across multiple domains such as healthcare, finance, retail, agriculture, and education.

| UNIT 1 | Hrs:08 |
|---|---|

**Introduction to Artificial Intelligence:** Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Limited Memory, Theory of Mind, Self-Awareness, Is Artificial Intelligence Same as Augmented Intelligence and Cognitive Computing, Machine Learning and Deep Learning.
**Machine Intelligence:** Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Agent and Environment, Search, Uninformed Search Algorithms, Informed Search Algorithms: Pure Heuristic Search, Best-First Search Algorithm (Greedy Search).
**Knowledge Representation:** Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge.

**Textbook Map:**
**Textbook 1: Chapter 1 (1.1-1.5), Chapter 3 (3.1-3.7.2), Chapter 4 (4.1-4.4)**

| UNIT 2 | Hrs: 08 |
|---|---|

**Introduction to Prompt Engineering**, Introduction to Prompt Engineering, The Evolution of Prompt Engineering, Types of Prompts, How Does Prompt Engineering Work?, Comprehending Prompt Engineering's Function in Communication, The Advantages of Prompt Engineering, The Future of LLM Communication.
**Prompt Engineering Techniques for ChatGPT**, Introduction to Prompt Engineering Techniques, Instructions Prompt Technique, Zero, One, and Few Shot Prompting, Self-Consistency Prompt.
**Prompts for Creative Thinking:** Introduction, Unlocking Imagination and Innovation.
**Prompts for Effective Writing:** Introduction, Igniting the Writing Process with Prompts.

**Textbook Map:**
**Textbook 2: Chapters 1,3,4 & 5**

| UNIT 3 | Hrs: 08 |
|---|---|

**Machine Learning:** Techniques in AI, Machine Learning Model, Regression Analysis in Machine Learning, Classification Techniques, Clustering Techniques, Naïve Bayes Classification, Neural Network, Support Vector Machine (SVM).

**Textbook Map:**
**Textbook 1: Chapter 2 (2.1-2.8)**

| **UNIT 4** | **Hrs: 08** |
|---|---|

**Trends in AI:** AI and Ethical Concerns, AI as a Service (AIaaS), Recent trends in AI, Expert System, Internet of Things, Artificial Intelligence of Things (AIoT).

**Textbook Map:**
**Textbook 1: Chapter 8 (8.1, 8.2, 8.4), Chapter 9 (9.1- 9.3)**

| **UNIT 5** | **Hrs: 08** |
|---|---|

Robotics, Robotics-an Application of AI, Drones Using AI, No Code AI, Low Code AI.
**Industrial Applications of AI:** Application of AI in Healthcare, Application of AI in Finance, Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education, Application of AI in Transportation, AI in Experimentation and Multi-disciplinary research.

**Text book Map:**
**Textbook 1: Chapter 8 (8.3), Chapter 1 (1.7, 1.8, 1.10, 1.11)**
**Textbook 3: Chapter 3, Chapter 5 (5.1)**

**Teaching Learning Process:** Chalk and Board, PPT

**Course Outcomes: At the end of the course students should be able to:**

**CO1:** Explain the concepts and types of artificial intelligence.
**CO2**: Make use of prompt engineering techniques to interact with generative AI tools.
**CO3:** Illustrate basic machine learning methods for regression, classification and clustering.
**CO4**: Outline recent trends in artificial intelligence and machine learning.
**CO5:** Identify real-world applications across different disciplines.

**Suggested Learning Resources:**

**Textbooks:**

| Sl No | Title | Author | Year & Edition | Publisher |
|---|---|---|---|---|
| 1 | Artificial Intelligence: Beyond Classical AI | Reema Thareja, | 2023 | Pearson Education |
| 2 | Prompt Engineering: Empowering Communication | Ajantha Devi Vairamani and Anand Nayyar, | 2024 | CRC Press, Taylor & Francis Group |
| 3 | "AI for Everyone – A Beginner's Handbook for Artificial Intelligence", | Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti, | 2024 | Pearson |

**Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1. | Artificial Intelligence: A Modern Approach | Stuart Russell and Peter Norvig | 2023, 4th Edition | Pearson Education, |
| 2. | Artificial Intelligence, | Elaine Rich, Kevin Knight, and Shivashankar B. Nair | | McGraw Hill Education. |
| 3. | Prompt Engineering for Generative AI | Tom Taulli | | O'Reilly Media, |

| | | | | |
|---|---|---|---|---|
| 4. | Artificial Intelligence: Making A System Intelligent | Nilakshi Jain | 1st Edition | Wiley. |

**Web links and Video Lectures (e-resources)**

01. Elements of AI – https://www.elementsofai.com
02. CS50's Introduction to Artificial Intelligence with Python – Harvard https://cs50.harvard.edu/ai/
03.Google Machine Learning Crash Course – https://developers.google.com/machine-learning/crash-course
04. Learn Prompting (Open-Source Guide) – https://learnprompting.org
05. Google AI – Learn with Google AI https://ai.google/education/
06. Coursera – Machine Learning by Andrew Ng (Stanford University) https://www.coursera.org/learn/machine-learning
07. OpenAI Prompt Engineering Guide (for ChatGPT) https://platform.openai.com/docs/guides/gpt-best-practices
08. Prompt Engineering for Developers – DeepLearning.AI + OpenAI https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/
09. Ethics in AI – Google Responsible AI Practices https://ai.google/responsibilities/responsible-ai-practices/
10. Google Teachable Machine (Train AI models visually without code) https://teachablemachine.withgoogle.com

**Active Based Learning (Suggested Activity in Class)/Practical based Learning**

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- ICT-Enabled Teaching
- Tool Demonstration

**CO-PO Mapping**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 1 | - | - | 1 | 2 | - | - | 1 | - | 1 | - | 1 |
| CO2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | - | 1 | 2 | 2 |
| CO3 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | - | - | - | 2 | 2 | 2 |
| CO4 | 2 | - | - | 1 | 2 | 1 | 1 | - | - | - | 1 | 1 | 1 |
| CO5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |

| Academic Year: 2025-26 | Semester: II | Scheme: P25 |
|---|---|---|
| **Course Title: Introduction to Electronics and Communication Engineering** | | |
| **Course Code: P25ESC2043** | CIE Marks: 50 | CIE Weightage: 50 |
| Teaching hours/week (L: T:P): 3:0:0 | SEE Marks: 50 | SEE Weightage:50 |
| Teaching hours of Pedagogy: 40 | Exam Hours: 3 | |
| Credits: 3 | | |

**Prerequisite:** Mathematics, Physics, and chemistry

**Course learning Objectives:**

- To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
- To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
- Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social Context, and life-long learning needed for a successful professional career.

| **Unit 1:** | **Hrs: 8** |
|---|---|

**Power Supplies:** Block Diagram, Rectifiers, Reservoir and Smoothing Circuits, Improved Ripple Filters, Full Wave Rectifiers, Bi Phase Rectifiers Circuits, Bridge Rectifier Circuits, Voltage Regulators, Output Resistance and Voltage Regulation, Voltage Multipliers, (Only Voltage Doubler) Switched Mode Power Supplies.

**Amplifiers:** Types of Amplifiers, Gain, Input and Output Resistance, Frequency Response, Bandwidth, Phase Shift, Negative Feedback.

Text 1: Page No: 117-128, 139-146

**Self-Study Content:** Multistage Amplifiers, Power Amplifiers.

| **Unit 2:** | **Hrs:8** |
|---|---|

**Oscillators:** Positive Feedback, Condition for Oscillations, Ladder Network Oscillator, Wein Bridge Oscillator, Single-Stage Astable Oscillator, Crystal Controlled Oscillators (Only Concepts, Working, and Waveforms. No Mathematical Derivations)

**Operational Amplifiers:** Operational Amplifier Parameters, Operational Amplifier Characteristics, Operational Amplifier Configurations, Operational Amplifier Circuits.

Text 1: Page No:179-186, 165-169, 171-175

**Self-Study Content:** Practical Operational Amplifier Circuits.

| **Unit 3:** | **Hrs: 8** |
|---|---|

**Analog Communication Schemes:** Introduction, Modern Communication System Scheme: Information Source and Input Transducer, Transmitter, Channel or Medium, Noise, Receiver, Concept of Modulation, Concept of Radio Wave Propagation (Ground, Space, Sky), Types of Communication Systems. Modulation Schemes: Amplitude Modulation, Angle Modulation, Advantages of Digital Communication Over Analog Communication, Multiplexing, Digital Modulation Schemes: ASK, FSK, PSK, (Explanation with Waveform)

Text 2: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.9, 1.12, 1.15, 2.2.1, 3.2.1, 6.1, 6.11, 6.12, 6.13, 6.15, 6.16.

**Self-Study Content:** Other Modulation Techniques.

| **Unit 4:** | **Hrs:8** |
|---|---|
| **Embedded Systems:** Definition, Embedded Systems Vs General Computing Systems, Classification of Embedded Systems, Major Application Areas of Embedded Systems, Purpose of an Embedded System, Core of The Embedded System: Microprocessors, GPP Vs ASIP, Microcontrollers, Microprocessor Vs Microcontroller, DSP, RISC V/S CISC, Memory: ROM, Sensors, Actuators, LED, 7-Segment LED Display.<br>Text 3: 1.1, 1.2, 1.4, 1.5, 1.6, 2.1.1.1-2.1.1.6, 2.2.1, 2.3.1, 2.3.2, 2.3.3.1, 2.3.3.2. | |
| **Self-Study Content:** RAM, Optocoupler, Stepper motor. | |
| **Unit 5:** | **Hrs:8** |
| **Boolean Algebra and Logic Circuits:** Binary Numbers, Number Base Conversion- Binary, Decimal and Octal and Hexa Decimal Numbers and Vice-Versa, Complements-1's and 2's, Basic Definitions,<br>Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.<br>**Combinational Logic:** Introduction, Design Procedure, Adders- Half Adder, Full Adder.<br>Text 4: 1.2, 1.3, 1.4, 1.5, 2.1, 2.3, 2.4, 2.5, 2.7, 4.1, 4.2, 4.3. | |
| **Self-Study Content:** Other Combinational Circuits. | |

**Suggested Learning Resources:**

**Textbooks:**

| Sl. No | Title | Author | Year & Edition | Publisher |
|---|---|---|---|---|
| 1. | Electronic Circuits Fundamentals & Applications | Mike Tooley | 2020, 5th Edition, | Elsevier |
| 2. | Communication Systems | S L Kakani and Priyanka Punglia | 2017, 1st Edition | New Age International Publisher |
| 3. | Introduction to Embedded Systems | K V Shibu | 2019, 2nd Edition | McGraw Hill Education |
| 4. | Digital Logic and Computer Design | M. Morris Mano | 2017 | Pearson Education |
| **Reference Books:** | | | | |
| 1. | Electronic Devices and Circuit Theory | Robert L. Boylstad, Louis Nashelsky | 2015,11th Edition | PHI |
| 2. | Basic Electronics | D.P Kothari and I. J Nagarath | 2014 | McGraw Hill Education |

**Web links and Video Lectures (e-resources)**

1. https://nptel.ac.in/courses/122106025
2. https://nptel.ac.in/courses/108105132

**Course Outcomes:** On completion of this course, students are able to:

| COs | **Course Outcomes** with ***Action verbs*** for the Course topics | **Bloom's Taxonomy Level** | **Program Outcome Addressed (PO #) with BTL** |
|---|---|---|---|
| **CO1** | **Analyze** the principles and applications of power supplies, amplifiers, oscillators for engineering applications. | **Analyse** | PO1, PO2, [L3] |

| | | | |
|---|---|---|---|
| **CO2** | **Analyse** and compare different modulation schemes evaluating their performance to various communication systems. | **Analyse** | PO2 [L4] |
| **CO3** | **Illustrate** the fundamentals of embedded systems demonstrating their purpose in developing various embedded applications | **Apply** | PO2 [ L3] |
| **CO4** | **Apply** Boolean algebra and logic circuits to design an optimized digital circuit for the given specifications. | **Apply, Design** | PO2, PO3 [L3, L4] |
| **CO5** | **Design & Evaluate** for the performance of different communication systems, embedded systems and various circuit configurations. | **Design, Evaluate** | PO4, PO5 [L5] |

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **#1** | 3 | | | | | | | | | | | 3 | |
| **#2** | 3 | | | | | | | | | | | 3 | |
| **#3** | | 3 | | | | | | | | | | | 3 |
| **#4** | | | 2 | | 2 | | | | 2 | | | | |

| **Active Based Learning (Suggested Activity in Class)/ Practical Based Learning (Example)** |
|---|
| 1. Flipped Classroom<br>2. Problem-Based Learning (PBL)<br>3. Case-Based Teaching<br>4. Simulation and Virtual Labs<br>5. Partial Delivery of course by Industry expert/ industrial visits<br>6. ICT-Enabled Teaching<br>7. Role Play |

| | | |
|---|---|---|
| Academic Year: 2025-26 | Semester: II | Scheme: P25 |
| Course Title: Elements of Mechanical Engineering | | |
| Course Code: P25PSC2052 | CIE Marks:50 | CIE Weightage:50% |
| Teaching hours/week (L:T:P): 3:0:0 | SEE Marks:50 | SEE Weightage:50% |
| Teaching hours of Pedagogy:40 Hours | Exam Hours: 3 Hrs | |
| Credits:03 | | |

**Course Learning Objectives:**

- To understand the properties and applications of engineering, composite, smart, and nano materials.
- To learn the basic principles of thermodynamics, IC engines, and electric/hybrid vehicles.
- To study the working of machine tools, joining processes, and power transmission systems.
- To explore automation, robotics, CNC, additive manufacturing, and AI applications in mechanical engineering.

| **Unit 1:** | **Hrs:8** |
|---|---|

**Engineering materials:** Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications.
**Composite materials:** Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials in Aerospace and Automobile industries.
**Smart materials:** Introduction, Types - Piezoelectric materials, MR fluids, Shape memory alloys and Advantages, Disadvantages and Applications.
**Nano materials:** Introduction, Types of nano materials, Advantages, Disadvantages and Applications.

| **Unit 2:** | **Hrs:8** |
|---|---|

**Concepts of Thermodynamics:** Work, Energy, Heat, Modes of Heat transfer: Conduction, Convection and Radiation. Steam: Formation of steam, Properties of Steam, Numericals related to the properties of steam.Introduction to Heat engines and Heat pumps.
**Introduction to Internal Combustion engines:** Working principle of Two stroke and Four stroke engines (SI & CI Engines), No Numericals.
**Electric vehicles and Hybrid vehicles:** Working principles, Electric and Hybrid vehicle components, Brief introduction to energy storage in Electric vehicles

| **Unit 3:** | **Hrs:8** |
|---|---|

**Machine Tools: Lathe:** Working principle, Specifications, Operations performed – Turning, Facing, Taper turning by swivelling the compound rest, Thread cutting and Knurling.
**Drilling Machine:** Working principle, Specifications, Operations performed – Drilling, Reaming, Boring, Counterboring, Countersinking, Tapping.
**Milling machine:** Working principle, Specifications, Operations performed – Plane milling, End milling, Slot milling, Angular milling.(Sketches of machine tools not required. Sketches to be used only for explaining the operations).
**Joining Processes:** Introduction, Temporary and Permanent joining methods: Working principle of Soldering, Brazing and Electric Arc welding, Advantages, Limitations and Applications

| **Unit4:** | **Hrs:8** |
|---|---|

**Belt drives:** Introduction, Open and Cross belt drives. (No derivations and numericals), Flat belts and V belts.
**Gear Drives:** Types of Gears, Velocity ratio, Gear Trains - Simple and Compound gear trains and Numericals.
**Robotics:** Introduction, Generation of Robots, Asimov's laws of Robots, Robot anatomy - Links and Joints, Types of Robots, Configurations of Robots, Robot motion - Degrees of Freedom, Robot

| sensors: Tactile, Force, Proximity and Vision sensors, Definition of Work volume, Accuracy, Precision, Repeatability and Payload. | |
|---|---|
| **Unit 5:** | **Hrs:8** |
| **Computer Numerical Control (CNC):** Introduction, Definition of NC and CNC Components of CNC. Definition of CAD, CAM, CAE and CIM.<br>**Automation:** Definition, Types of Automation, Reasons for Automation.<br>**Additive manufacturing:** Introduction, Basic principles (Steps in additive manufacturing), Additive manufacturing processes – Photopolymerization technique, Material extrusion technique and Powder based fusion technique, Automotive and Aerospace applications.<br>**Applications of AI in Mechanical Engineering:** Automobile industry, manufacturing industry and Mechanical design. | |

**Suggested Learning Resources:**

**Textbooks:**

| Sl. No. | Title | Author | Year & Edition | Publisher |
|---|---|---|---|---|
| 1 | Elements of Mechanical Engineering | K R Gopala Krishna | 2018 | Subhash Publications |
| 2 | Elements of Workshop Technology (Vol. I and II). | S K Hajra Choudhury and Nirjhar Roy | 2016 | Media Promoters and Publishers Pvt. Ltd. |
| 3 | Internal Combustion Engines | Ganeshan. V | 2012, 4th Edition | Tata McGraw Hill |
| 4 | Thermal Engineering | Rajput R.K | 2007, 6th Edition | Laxmi Publications (Pvt) Ltd., New Delhi. |
| 5 | Automation Production Systems and Computer Integrated Manufacturing | Mikell P. Grover | 2004 | PHI |
| 6 | Electric and Hybrid Vehicles: Design Fundamentals | Husain Iqbal | 2021, 3rd Edition | CRC Press |
| 7 | Additive Manufacturing Technologies: 3DPrinting, Rapid Prototyping, and Direct Digital Manufacturing | Ian Gibson, David. W. Rosen, Brent Stucker | 2014, 2nd Edition | Springer |
| 8 | CAD/CAM. | Mikell P. Groover and Emory W. Zimmers. | 2007 | Zimmer & Groover CAD/CAM |

**Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1. | Manufacturing Engineering and Technology | Serope Kalpakjian and Steven R Schmid | 2000, 4th Edition | Pearson Education, Asia |
| 2. | CAD/CAM/CIM | Radha Krishna & S. Subramanian | 2009 | New Age International Publishers |
| 3. | Composite materials: Engineering and Science | F. L. Matthews and R. D. Rawlings | 2003 | Woodhead Publishing Ltd. & CRC Press |
| 4. | Industrial Robotics | Mikell P.Groover and | 2008 | Tata McGraw Hill |

| | | | | |
|---|---|---|---|---|
| | technology, programming and applications | Mitchel Weiss and Roger N. Nagel Nicholas G.Odrey, | | Edition |

**Web links and Video Lectures ( e-resources)**

- https://nptel.ac.in/courses/112104526
- https://nptel.ac.in/courses/112104616
- https://nptel.ac.in/courses/112104769
- https://venturebeat.com/ai/how-ai-is-impacting-the-automotive-world/
- https://www.vlcsolutions.com/blog/artificial-intelligence-in-manufacturing/
- https://skill-lync.com/blogs/technical-blogs/design-applications-of-machine-learning-and-ai-inmechanical-engineering
- https://caeassistant.com/blog/ai-in-mechanical-engineering-video/
- https://www.neuralconcept.com/post/how-is-ai-used-in-mechanical-engineering
- https://www.youtube.com/watch?v=MKiiXubKaGM
- https://www.youtube.com/watch?v=_canCYWZPsc
- https://www.youtube.com/watch?v=lQ-MYnyxh7M

**Teaching-Learning Process (Innovative Delivery Methods)**

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Simulation and Virtual Labs
- Partial Delivery of course by Industry experts
- ICT-Enabled Teaching
- Video demonstration

**Course Articulation Matrix**

| Course Outcomes | | Program Outcomes | | | | | | | | | | | PSO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 | 2 |
| **CO1** | Analyse the properties of steam, various engineering materials along with their classifications and applications. | **3** | **2** | | | | | | | | | | | |
| **CO2** | Illustrate the basic concepts of thermodynamics, internal combustion engines and electric/hybrid vehicles. | **3** | **3** | | | | | **2** | | | | | | |
| **CO3** | Demonstrate the working and operations of machine tools and metal joining techniques. | **3** | | **3** | | **2** | | | | | | | | |
| **CO4** | Outline the configuration, anatomy, and performance parameters of robots. | **3** | | **2** | | **3** | | | | | | | | |
| **CO5** | Apply the concepts of belt and gear drives to solve basic numerical problems related to velocity ratio in gear drives. | **3** | **2** | **2** | | | | | | | | | | |
| **CO6** | Discuss the role of computer systems in manufacturing, their contribution to automation, and the applications of 3D printing and AI in mechanical engineering | **3** | | **2** | | **2** | | | | | | **2** | | |

| Academic Year: 2025-26 | Semester: I/II | Scheme: P25 |
|---|---|---|
| Course Title: Elements of Mechanical Engineering Lab | | |
| Course Code: P25PSCL2064 | CIE Marks:50 | CIE Weightage:50% |
| Teaching hours/week (L:T:P): 0:0:2 | SEE Marks:50 | SEE Weightage:50% |
| Teaching hours of Pedagogy:20 Hours | Exam Hours: 3 Hrs | |
| Credits:01 | | |

**Course Learning Objectives:**

- Learn to perform basic machining operations using a lathe and welding processes.
- Understand the calibration and accurate use of common measuring instruments.
- Develop skills in measuring angles, hardness, and material properties.
- Explore open-ended experiments to analyze fuel characteristics and joining techniques.

**PART – A**
**CONVENTIONAL EXPERIMENTS**

1. Performing facing, plain turning and step turning operations by using a lathe.
2. Performing facing, plain turning and knurling operations by using a lathe.
3. Preparation of welded joints using the arc welding process.
4. Calibration of vernier caliper and micrometer using slip gauges.
5. Determination of the angle of a specimen using a sine bar.
6. Determination of the hardness of materials using hardness testing machine.

**PART – B**
**TYPICAL OPEN-ENDED EXPERIMENTS**

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Comparative study of flash point and fire point of various fuels / oils using the open cup method
2. Comparative study of flash point and fire point of various fuels / oils using the closed cup method
3. Comparative study on viscosity of different base fuels.
4. Investigation of the effect of additives on the viscosity of base fuels.
5. Selection and justification of appropriate joining techniques for given applications
6. Fabrication of a sheet metal part with simple geometry and soldering.

**Suggested Learning Resources:**

**Textbooks:**

| Sl.No. | Title | Author | Year & Edition | Publisher |
|---|---|---|---|---|
| 1 | Manufacturing Science | Amitabh Ghosh and Amit Kumar Mallik | 2002 | Affiliated East West Press (p) Ltd, New Delhi |
| 2 | Workshop Technology | Hajara and Choudhary, | Vol. I (2008) & II (2010) | Median Promoters & publishers, Bombay |
| 3 | Workshop Practice | Khanna O. P, | Vol. I, 2000 | Dhanpat Rai & Co |
| 4 | Engineering Metrology | R.K. Jain | 2009 | Khanna Publishers, Delhi |

**Reference Books:**

| | | | | |
|---|---|---|---|---|
| 1. | Manufacturing Engineering and Technology | Serope Kalpakjian and Steven R Schmid, | 2000, 4th Edition | Pearson Education, Asia |
| 2. | Manufacturing technology--Foundry, Forming and Welding | P.N. Rao | 2001 | Tata McGraw Hill Education |
| 3. | Engineering Metrology | I.C. Gupta | 2018 | Dhanpat Rai Publications, New Delhi |
| 4. | Internal Combustion Engines | Ganeshan. V | 2012, 4th Edition | Tata McGraw Hill |

**Web links and Video Lectures ( e-resources)**

- https://openoregon.pressbooks.pub/manufacturingprocesses45/chapter/chapter-unit-1-theengine-lathe/
- https://www.millerwelds.com/resources/article-library/the-fundamentals-of-welding-process-equipment-and-applications
- https://www.youtube.com/watch?v=sbbwJ5p6irc
- https://www.youtube.com/watch?v=TlhGTSDfQxc

**Teaching-Learning Process (Innovative Delivery Methods)**

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Simulation and Virtual Labs
- Video demonstration

**Course Articulation Matrix**

| Course Outcomes | | Program Outcomes | | | | | | | | | | | PSO | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 | 2 |
| **CO1** | Perform various operations using lathe and welding machine. | **3** | | **3** | | **2** | | | | | | | | |
| **CO2** | Calibrate various measuring devices to achieve accuracy of measurement. | **3** | **2** | | **2** | **3** | | | | | | | | |
| **CO3** | Demonstrate angular measurement of a given specimen using appropriate device. | **3** | **2** | | **2** | **3** | | | | | | | | |
| **CO4** | Determine the properties and characteristics of fuels and oils | **3** | **2** | | **2** | **2** | | | | | | | | |
| **CO5** | Determine the hardness of materials using hardness testing machine. | **3** | **2** | | **2** | **2** | | | | | | | | |

| **Academic Year: 2025-26** | | |
|---|---|---|
| **Course Title: Physics of Materials Laboratory**<br>**Semester: II** | | |
| **Course Code:** | **P25PHMEL207** | **Credit: 01** |
| **Teaching hours/week (L:T:P):** | **0:0:2** | **CIE Marks:50** |
| **Teaching hours of Pedagogy:** | **10-12 Lab slots** | **SEE Marks:50** |

**Course Learning Objectives:**

- Identify the experimental methods to determine mechanical, elastic and oscillatory properties of engineering materials
- Setup or construct the circuit to perform experiments related to Engineeering applicatons.
- To develop the skills in using experimental techniques, measurement tools and simulation software for analyzing materials in mechanical engineering.

| **PART–A : Fixed Set of Experiments** | **24 Hours** |
|---|---|

1. Determination of **Young's modulus** of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using **Torsional Pendulum**.
3. Study of Forced Mechanical **Oscillations and Resonance**.
4. Study of the frequency response of Series & Parallel **LCR circuits**.
5. Determination of effective **spring constant** of the given springs in series and parallel combinations.
6. Verification of **Newton's Law of Cooling**.
7. Determination of Young's modulus of the material of the given bar using **Single Cantilever**.
8. Determination of **Moment of Inertia** of the given irregular body by setting Torsional Oscillations.
9. Determination of Grating constant using **LASER Diffraction** / Estimation of particle size of lycopodium powder using Laser Diffraction.
10. Experiment on **Thermo-emf / Peltier Module**.
11. Determination of **Planck's Constant** using LEDs.
12. **STEP** Interactive Physical Simulations. (Springs, Simple Pendulum)
13. **PHET** Interactive Simulation (Relevant to Theory)
14. Data Analysis using **Spread Sheets**.

**Course Outcomes:** On completion of this course, students should be able to:

**CO1:** Apply the fundamental concepts of physics by performing laboratory experiments to determine mechanical and material properties relevant to engineering applications.

**CO2:** Analyze and interpret experimental data, calculate errors and compare results with theoretical predictions to validate physical laws and engineering applications

**CO3:** Demonstrate the use of simulation tools such as PHET, Spreadsheets and Tracker to model, visualize and investigate physical phenomena in the field of mechanical engineering.

| **Suggested Learning Resources:** | | | | |
|---|---|---|---|---|
| **Textbooks:** | | | | |
| | **Title** | **Author** | **Year & Edition** | **Publisher** |
| 1. | A Textbook of Engineering Physics (Practical Experiments) | M N Avadhanulu, P G Kshirsagar, Arun Murthy | Revised Edition, 2022 | S Chand |
| 2. | Practical Physics | R K Shukla, Anchal Srivastava | 2nd Edition, 2018 | New Age International |
| 3. | College Practical Physics | S L Gupta, V Kumar | 4th Edition, 2019 | Pragati Prakashan |
| **Reference Books:** | | | | |
| 1. | Practical Physics | C L Arora | 1st Edition, 2012 | S Chand |
| 2. | Engineering Physics Practicals | S Rajendran, P Marikani | 2nd Edition, 2011 | Vikas Publishing House |
| 3. | A Laboratory Manual of Physics for Engineering Students | B S Rajput | 2014 | Pragati Prakashan |
| 4. | Experimental Physics | R K Shukla, S Srivastava | 1st Edition, 2015 | New Age International |

| **Course Articulation Matrix of Applied Physics Laboratory**<br>**Physics for Sustainable Structural Systems (CV Stream)** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **COs / POs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** |
| **CO1** | 3 | 2 | - | - | - | - | - | - | - | - | - |
| **CO2** | 2 | 3 | - | 2 | - | - | - | - | 2 | - | - |
| **CO3** | 1 | 2 | - | - | 3 | - | - | - | 1 | - | 2 |

| **Course Title:** | Communicative English – II (Common to all branches) | | |
|---|---|---|---|
| **Course Code:** | P25ENG208 | **CIE Marks** | 50 |
| | Theory | **SEE Marks** | 50 |
| | | **Total Marks** | 100 |
| **Teaching Hours/Week (L: T:P:S)** | 0:2:0:2 | **Exam Hours** | 02 Theory |
| **Total Hours of Pedagogy** | 30 hours | **Credits** | 01 |

| | |
|---|---|
| **Module-1: Listening Skills II** | **2 Hours** |
| Levels of listening, Active listening, Techniques of listening. Activity: Listening for main ideas and listening for specific information | |
| **Speaking Skills II** | **6 Hours** |
| Language of discussion – Giving opinion, agreeing / disagreeing, asking questions, making suggestions. Sentence stress – content and structure words, Speaking situations, Intonations and Summarizing skills | |
| **Module-2: Reading Skills II** | **2 Hours** |
| Guessing meaning from the context, understanding graphical information, Summarizing. Activity: Book review | |
| **Writing Skills II** | **4 Hours** |
| Linkers and connectives, Sentence and paragraph transformation, Mind mapping techniques, Letter writing, Essay writing | |
| **Module-3: Email Etiquette** | **4 Hours** |
| Parts of an email, Writing an effective subject line, email language and tone. Activity: Email writing practice - Scenario based emails | |
| **Group Presentations** | **2 Hours** |
| Group presentations by the students. | |
| **Module-4 Goal Setting** | **2 Hours** |
| Defining goals, types of goals, Establishing SMART goals, Steps in setting goals, Goal setting activity | |
| **Individual Presentations** | **4 Hours** |
| Individual presentation by the students | |
| **Module-5 Teamwork** | **4 Hours** |
| Defining teams, Team vs. Group, Benefits and challenges of working in teams, Stages of team building, building effective teams, Case studies on teamwork | |
| Course Outcomes: On completion of this course, students will be able to,<br>CO1: Develop skills in listening, speaking, reading, and writing for effective communication.<br>CO2: Write effective emails, essays, and use proper email etiquette including subject lines, language, and tone.<br>CO3: Define goals (individual and team), establish SMART goals, and work effectively in teams including stages of team building and benefits/challenges of teamwork.<br>CO4: Develop skills for individual and group presentations | |

**Textbooks and Reference Books:**


1. Communication Skills by Sanjay Kumar and Pushpa Lata, Oxford University Press - 2015.
2. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.

3. Developing Communication Skills by Krishna Mohan& Meera Banerjee (Macmillan)
4. The Oxford Guide to Writing and Speaking, John Seely, Oxford.
5. English Language Communication Skills - Lab Manual cum Workbook by Rajesh Kumar Singh, Cengage learning India Pvt Limited – 2018
6. The 7 habits of highly effective people by Stephen R Covey, Simon & Schuster – 2020.
7. You Are the Team: 6 Simple Ways Teammates Can Go from Good to Great by Michael G. Rogers.

**CO – PO – PSO Matrix**

| CO | PO | | | | | | | | | | | | PSO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | | PSO1 | PSO2 | PSO3 |
| *CO1* | | | | | 1 | | | | 3 | | 1 | | | | |
| *CO2* | | | | | 2 | | | | 3 | | | | | | |
| *CO3* | | | | | | | | 3 | 1 | | 2 | | | | |
| *CO4* | | | | | 2 | | | 3 | 1 | | | | | | |
| *CO5* | | | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| **Academic Year:** 2025-2026 | **Semester:** II | | **Scheme:** P25 |
| **Course Title: Interdisciplinary Project Based Learning** | | | |
| **Course Code:** P25IDT209 | **CIE Marks:** 50 | | **CIE Weightage:** 50 |
| **Teaching hours/week (L: T:P)** 0:0:2 | **SEE Marks:** 50 | | **SEE Weightage**:50 |
| **Teaching hours of Pedagogy:** - | **Exam Hours:** 02 | | |
| **Credits:** 01 | | | |

**Prerequisite:**

- Basic understanding of design thinking principles
- Open-mindedness to diverse perspectives
- Effective communication, problem-solving skills and team collaboration

**Course learning Objectives**:

After learning this course, the student will be able to

- Design effective questionnaires and feedback forms for usability and experience evaluation.
- Create an Empathy Map to better understand the user's mindset, needs, and experiences.
- Understand the basics of early-stage business planning for social innovation projects.
- Present a fully functional Proof of Concept (PoC) to evaluators and stakeholders.

**Course content**

**Week – 1 & 2: Introduction and first Semester Recap**- Project-based learning & interdisciplinarity, User Testing Preparation & Execution - Interview Techniques and Questionnaire design, Field Visit.

**Week – 3, 4 & 5: Analysis, Feedback & Prioritization-** Feedback analysis, Customer Journey Mapping, Stakeholder Mapping and Empathy map.

**Week – 6, 7 & 8: Iteration & Refinement-** Feature improvement using SCAMPER technique, Iteration Sprint 1, Iteration Sprint 2

**Week – 9, 10 &11: Presentation & Future Planning-** Business Model Canvas, Pitch deck creation

**Week - 12, 13 & 14: Final demo and social pitch -** Prototype building, Hackathon and Demo Day

**Course Outcomes:** At the end of the course students should be able to:

CO1: Analyse user feedback using empathy mapping to validate and refine problem–solution fit.

CO2: Develop the solution through iterative sprints based on validated user insights.

CO3: Develop a business plan and pitch deck articulating value proposition, feasibility, sustainability, and implementation strategy.

CO4: Demonstrate a Proof of Concept (PoC) and present a future roadmap by integrating technical, user, and business learnings during Demo Day.

| Course Articulation Matrix | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Outcomes | | Program Outcomes | | | | | | | | | | | | PSO | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| CO1 | Analyze user feedback using empathy mapping to validate and refine problem–solution fit. | | 3 | | 3 | | | | 2 | 2 | 2 | | | | |
| CO2 | Develop the solution through iterative sprints based on validated user insights. | | | 3 | 2 | 2 | | | | 2 | | | 2 | | |
| CO3 | Develop a business plan and pitch deck articulating value proposition, feasibility, sustainability, and implementation strategy. | | | | | | | | | 2 | 3 | 3 | | | |
| CO4 | Demonstrate a Proof of Concept (PoC) and present a future roadmap by integrating technical, user, and business learnings during Demo Day. | | | 3 | 2 | 2 | | | | 2 | 3 | 2 | 2 | | |

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ** – ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

| **Course Title:** | **ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ** | | |
|---|---|---|---|
| **Course Code:** | **P25KSK110** | **CIE Marks** | **100** |
| **Course Type (Theory/Practical /Integrated)** | **Theory** | **SEE Marks** | **-** |
| | | **Total Marks** | **100** |
| **Teaching Hours/Week (L:T:P:S)** | **0:2:0:0** | **Exam Hours** | **01 Theory** |
| **Total Hours of Pedagogy** | **15 hours** | **Credits** | **00** |

**Course Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

**The course will enable the students,**

೧. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಾಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

೨. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಹಯಿಸುವುದು.

೩. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಾಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.

೪. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.

೫. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

**ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process – General Instructions):**

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

೧. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

೨. ಇತ್ರೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು – ಅಂದರೆ ಕವಿ–ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.

೩. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

**Module-1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)**

೧. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ – ಹಂಪ ನಾಗರಾಜಯ್ಯ

೨. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ – ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

೩. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ – ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ. ವಿ. ಕೇಶವಮೂರ್ತಿ

**Module-2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)**

೧. ವಚನಗಳು: ಬಸವಣ್ಣ, ಅಕ್ಕಮಹದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.

೨. ಕೀರ್ತನೆಗಳು: ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು

೩. ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ – ಕನಕದಾಸರು

೪. ತತ್ವಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಶರೀಫಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case

**Module-3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)**

೧. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು

೨. ಕುರುಡು ಕಾಂಚಾಣ: ದಾ.ರಾ. ಬೇಂದ್ರೆ

| |
|---|
| ೩. ಹೊಸಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು |
| **Module-4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)** |
| ೧. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ: ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ ಎನ್ ಮೂರ್ತಿರಾವ್<br>೨. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ: ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ |
| **Module-5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)** |
| ೧. ಯುಗಾದಿ: ವಸುಧೇಂದ್ರ<br>೨. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ |
| **ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಪರಿಣಾಮಗಳು (Course Outcomes)**<br>CO1: ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.<br>CO2: ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡತ್ತದೆ.<br>CO3: ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯು ಹೆಚ್ಚಾಗುತ್ತದೆ.<br>CO4: ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.<br>CO4: ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು. |
| **Assessment Details: Only CIE will be conducted for this course.**<br>**Continuous Internal Evaluation:**<br>Three Tests will be conducted in the pattern (20+ 40 + 40) for 100 Marks. CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.<br>**CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.** |
| **ಪಠ್ಯ ಪುಸ್ತಕ: University Prescribed Textbook**<br>**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ**<br>ಡಾ. ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಎಲ್. ತಿಮ್ಮೇಶ,<br>ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ |

## ಬಳಕೆ ಕನ್ನಡ - Balake Kannada (Kannada for Usage)

| | | | |
|---|---|---|---|
| **Course Title:** | **ಬಳಕೆ ಕನ್ನಡ** | | |
| **Course Code:** | **P25KSK110** | **CIE Marks** | **100** |
| **Course Type (Theory/Practical /Integrated)** | **Theory** | **SEE Marks** | **-** |
| | | **Total Marks** | **100** |
| **Teaching Hours/Week (L:T:P:S)** | **0:2:0:0** | **Exam Hours** | **01 Theory** |
| **Total Hours of Pedagogy** | **15 hours** | **Credits** | **00** |

**Course objectives: ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು**

The course will enable the students,

1. To create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conservation.
5. To know about Karnataka state and its language, literature and General information about this state.

**ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process – General Instructions):**

These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes.

೧. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರು ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಉಪಯೋಗಿಸಬೇಕು.

೨. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್‌ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

೩. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನು ತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತಿ ಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.

೪. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.

೫. ಭಾಷಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

**Module-1 (03 hours of pedagogy)**

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activites
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ / ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು –Personal Pronouns, Possessive Forms, Interrogative words

**Module-2 (03 hours of pedagogy)**

೧. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು – Possessive forms of nouns, dubitive question and Relative nouns

೨. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative and Colour Adjectives, Numerals

೩. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case

**Module-3 (03 hours of pedagogy)**

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| ೧. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು – Dative Cases, and Numerals<br>೨. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು – Ordinal numerals and Plural markers<br>೩. ನ್ಯೂನ / ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು – Defective / Negative Verbs and Colour Adjectives |
| **Module-4 (03 hours of pedagogy)** |
| ೧. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು<br>Permission, Commands, encouraging and Urging words (Imperative words and sentences)<br>೨. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು<br>Accusative Cases and Potential Forms used in General Communication<br>೩. **"**ಇರು ಮತ್ತು ಇರಲ್ಲ**"** ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು – Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs<br>೪. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ – Comparative, Relationship, Identification and Negation Words |
| **Module-5 (03 hours of pedagogy)** |
| ೧. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು –Differint types of forms of Tense, Time and Verbs<br>೨. ದ್, –ತ್, –ತು, –ಇತು, –ಆಗಿ, –ಅಲ್ಲ, –ಗ್, –ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ – Formation of past, Future and Present Tense Sentences with Verb Forms<br>೩. Kannada Vocabulary List: ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು – Kannada Words in Conversation |
| **Course Outcomes (Course Skill Set):**<br>**ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯದ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:**<br>At the end of the Couse, The Students will be able<br>**CO1:** To understand the necessity of learning of local language for comfortable life.<br>**CO2:** To Listen and understand the Kannada language properly.<br>**CO3:** To speak, read and write Kannada language as per requirement.<br>**CO4:** To communicate (converse) in Kannada language in their daily life with kannada speakers.<br>**CO5:** To speak in polite conservation. |
| **Assessment Details: Only CIE will be conducted for this course.**<br>**Continuous Internal Evaluation:**<br>Three Tests will be conducted in the pattern (20+ 40 + 40) for 100 Marks. CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.<br>**CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.** |
| **ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ** (Prescribed Textbook to Learn Kannada)<br>**ಪಠ್ಯ ಪುಸ್ತಕ** (**Text book):**<br>**ಬಳಕೆ ಕನ್ನಡ**<br>ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,<br>ಪ್ರಕಟಣೆ: ಪ್ರಸಾರಾಂಗ,<br>ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ |